USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Enhancing the Abiotic Degradation of Trichloroethylene with Bimetals

Duration: Sept. l, 1997 to Aug. 31, 1999

Federal funds requested: Total- $30,700(first year - $15,350; second year - $15,350)

Non-federal funds pledged: Total - $61,470 (first year - $ 30,381; second year - $31,089)

Principal investigator:

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Congressional district: Iowa 3

Statement of critical regional or State water problems:

Release of chemicals from contaminated sites such as Superfund sites, landfills and hazardous waste disposal sites has a significant environmental impact on groundwater resources and may pose a potential risk to human health. In addition to these sites, US EPA has estimated that about 25% of two million underground storage tank (LIST) systems in the country may be leaking and may be a health risk to humans (U.S. EPA, I988). The state of Iowa and the States in the Midwest region are not exempted from this national problem. There are many Superfund sites within Iowa and the Midwest region which are contaminated with volatile organic compounds (VOCs) along with numerous gasoline stations and gasoline tank farms which have leaking storage tanks.

The state of Iowa has established a gasoline tax fund to provide funding, as needed, for the cleanup of leaking UST sites. Clean up standards of contaminated UST sites in Iowa are usually based on Federal environmental regulations such as the Clean Water Act and the Safe Drinking Water Act. To achieve the clean up standards as specified by Federal Regulations, new and innovative remedial technologies which are cost effective must be developed.

Statement of results or benefits:

The direct benefit of the proposed project is the development of an innovative remedial technology which is a simple but cost effective solution for the treatment of contaminated groundwater. The proposed technology is a modification of the reductive dehalogenation process using zero-valent iron. The modification is accomplished by plating one or more noble metals onto the surface of zero-valent iron. Degradation rates were shown to increase by at least one order of magnitude as compared to using zero-valent iron only. Preliminary results also showed that lower concentrations of daughter products were formed using this modification.